WHAT IS CLAIMED IS:

1. A Pt-based alloy according to the formula $Pt_aCo_bCu_cNi_dP_e$, wherein a is from about 39 to about 50 atomic percentage, b is from about 0 to 15 atomic percent, c is from about 16 to about 35 atomic percentage, d is from 0 to 15 atomic percent, and e is from about 17 to about 25 atomic percent, wherein the sum of b and d is greater than 2 atomic percent, and wherein Pt comprises 75 percent of the Pt-based alloy by weight.

2. The Pt-based alloy as described in claim 1, a is from about 41 to about 47 atomic percentage, b is from about 0 to 8 atomic percent, c is from about 12 to about 16 atomic percentage, d is from 0 to 13 atomic percent, and e is from about 19 to about 29 atomic percent, and wherein the sum of b and d is greater than 2 atomic percent.

3. The Pt-based alloy as described in claim 1, wherein d is 0.

4. The Pt-based alloy as described in claim 2, wherein d is 0.

5. The Pt-based alloy as described in claim 1, further comprising Pd, wherein where the total content of Pd and Pt in the alloy is less than about 40 atomic percent the ratio of Pd to Pt is up to 4, where the total content of Pd and Pt is between about 40 to about 50 atomic percent the ratio of Pd to Pt is up to 6, and where the total content of Pd and Pt is greater than 50 atomic percent the ratio of Pd to Pt is up to 8.

6. The Pt-based alloy as described in claim 1, wherein the ratio of Cu to the sum total of Ni and Co is in the range of about 0 to 4.

7. The Pt-based alloy as described in claim 1, where the ratio of Ni to Co is in the range of about 0 to 1.

8. The Pt-based alloy as described in claim 1, further comprising Si where the ratio of Si to P is from about 0 to 1.

9. The Pt-based alloy as described in claim 1, further comprising about 5 atomic percent or less of B.

10. The Pt-based alloy as described in claim 1, further comprising about 10 atomic percent or less of Cr.

11. The Pt-based alloy as described in claim 1, further comprising about 10 atomic percent or less of an element selected from the group consisting of Ir, Au, and a mixture thereof.

12. The Pt-based alloy as described in claim 1, further comprising about 5 atomic percent of less of an element selected from the group consisting of Ge, Ga, Al, Sn, Sb, and a mixture thereof.

13. A Pt-based alloy according to the formula $Pt_aCo_bCu_cNi_dP_e$, wherein a is from about 54 to about 64 atomic percentage, b is from about 0 to 8 atomic percent, c is from about 9 to about 20 atomic percentage, d is from 1 to 12 atomic percent, and e is from about 17 to about 24 atomic percent, wherein the sum of b and d is greater than 2 atomic percent, and wherein Pt comprises 85 percent of the Pt-based alloy by weight.

14. The Pt-based alloy as described in claim 13, a is from about 56 to about 62 atomic percentage, b is from about 0 to 5 atomic percent, c is from about 12 to about 16 atomic percentage, d is from 2 to 6 atomic percent, and e is from about 19 to about 23 atomic percent, and wherein the sum of b and d is greater than 2 atomic percent.

15. The Pt-based alloy as described in claim 13, wherein d is 0.

16. The Pt-based alloy as described in claim 14, wherein d is 0.

17. The Pt-based alloy as described in claim 13, further comprising Pd, wherein where the total content of Pd and Pt in the alloy is less than about 40 atomic percent the ratio of Pd to Pt is up to 4, where the total content of Pd and Pt is between about 40 to about 50 atomic percent the ratio of Pd to Pt is up to 6, and where the total content of Pd and Pt is greater than 50 atomic percent the ratio of Pd to Pt is up to 8.

18. The Pt-based alloy as described in claim 13, wherein the ratio of Cu to the sum total of Ni and Co is in the range of about 0 to 4.

19. The Pt-based alloy as described in claim 13, where the ratio of Ni to Co is in the range of about 0 to 1.

20. The Pt-based alloy as described in claim 13, further comprising Si where the ratio of Si to P is from about 0 to 1.

21. The Pt-based alloy as described in claim 13, further comprising about 5 atomic percent or less of B.

22. The Pt-based alloy as described in claim 13, further comprising about 10 atomic percent or less of Cr.

23. The Pt-based alloy as described in claim 13, further comprising about 10 atomic percent or less of an element selected from the group consisting of Ir, Au, and a mixture thereof.

24. The Pt-based alloy as described in claim 13, further comprising about 5 atomic percent of less of an element selected from the group consisting of Ge, Ga, Al, Sn, Sb, and a mixture thereof.

25. A Pt-based alloy according to the formula:

$$(Pt,Pd)_{1-x}PGM_x)_a((Cu,Co,Ni)_{1-y}TM_y)_b(P,Si)_{1-z}OM_z)_c,$$

where a is in the range of about 20 to 65 atomic percent, b is in the range of about 15 to 60 atomic percent, c is in the range of about 16 to 24 atomic percent, wherein Pt and P are each at least about 10 atomic percent of the whole, and where the total of Ni and Co content is at least about 2 atomic percentage;

where PGM is selected from the group consisting of Ir, Os, Au, W, Ru, Rh, Ta, Nb, and Mo;

where TM is selected from the group consisting of Fe, Zn, Ag, Mn, and V;

where OM is selected from the group consisting of B, Al, Ga, Ge, Sn, Sb, and As; and

where the x, y, and z fraction follow the following constraints:

z is less that about 0.3,

the sum of x, y, and z is less than about 0.5,

when a is less than about 35, then x is less than about 0.3 and y is less than about 0.1,

when a is in the range of about 35 to 50, then x is from about 0 to 0.1 and y is less than about 0.2, and

when a is more than about 50, then x is from about 0 to about 0.1 and y is less than about 0.3.

26. The Pt-based alloy as described in claim 25, wherein a is from about 25 to 60 atomic percent, b is from about 20 to 55 atomic percent, and c is from about 16 to 22 atomic percent.

27. The Pt-based alloy as described in claim 25, wherein a is from about 35 to 50 atomic percent, b is from about 30 to 45 atomic percent, c is from about 18 to 20 atomic percent, x is from about 0 to 0.2, and y is less than about 0.2.

28. A Pt-based alloy according to the formula:

$$(Pt_{1-x}Pd_x)_a(Cu_{1-y}(Co,Ni)_y)_b(P_{1-z}Si_z)_c,$$

where a is in the range of about 20 to 65 atomic percent, b is in the range of about 15 to 60 atomic percent, c is in the range of about 16 to 24 atomic percent, x is in the range of about 0 to 0.8, y is in the range of about 0.05 to 1, and z is in the range of about 0 to 0.4.

29. The Pt-based alloy as described in claim 28, where a is in the range of about 35 to 65 atomic percent, b is in the range of about 15 to 45 atomic percent, c is in the range of about 16 to 24 atomic percent, x is in the range of about 0 to 0.4, y is in the range of about 0.2 to 1, and z is in the range of about 0 to 0.4.

30. The Pt-based alloy as described in claim 29, wherein the alloy is Ni free.

31. A Pt-based alloy according to the formula:

$$Pt_a(Cu_{1-y}Ni_y)_bP_c,$$

where a is in the range of about 20 to 65 atomic percent, b is in the range of about 15 to 60 atomic percent, c is in the range of about 16 to 24 atomic percent, and y is in the range of about 0.05 to 1.

32. The Pt-based alloy as described in claim 31, where a is in the range of about 35 to 65 atomic percent, b is in the range of about 15 to 45 atomic percent, c is in the range of about 16 to 24 atomic percent, and y is in the range of about 0.05 to 1.

33. The Pt-based alloy as described in claim 32, where Co is substituted for Ni.

34. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a delta T (the supercooled liquid region) of more than 60 °C.

35. The Pt alloy as described in claim 34, where the delta T (the supercooled liquid region) is more than 80 °C.

36. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a hardness of at least 400 Hv.

37. The Pt alloy as described in claim 36, where the hardness is at least 500 Hv.

38. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a reduced glass transition temperature (Trg) of more than 0.6.

39. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a melting temperature od less than 600 °C.

40. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a critical casting thickness of more than 5.0 mm.

41. The Pt alloy as described in claim 40, where the critical casting thickness is more than 20 mm.

42. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a resistance to embrittlement during processing above its glass transition temperature.

43. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a maximum alloying temperature of less than 700 °C.

44. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a maximum flux-processing temperature of less than 800 °C to form an amorphous phase having a casting thickness of more than 5 mm .

45. The Pt alloy as described in claims 44, wherein the casting thickness is greater than 20 mm .

46. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a maximum casting temperature of less than 700 °C to form complicated shapes having an amorphous phase.

47. The Pt alloy as described in any of claims 1, 13, 25, 28, or 31, wherein the alloy has a maximum glass transition temperature of less than 250 °C.

48. A method of forming a three-dimensional object having at least 50% amorphous phase by volume from the Pt-based alloy as described in any one of claims 1, 13, 25, 28, or 31 comprising:

providing a molten volume of the Pt-based alloy;

quenching the entire volume of the alloy from above its melting temperature to a temperature below its glass transition temperature at a sufficient rate to prevent the formation of more than a 50 % crystalline phase by volume.

49. The method of claim 48, further comprising:

contacting the molten alloy with a piece of molten de-hydrated B_2O_3, wherein the alloy is still in contact with the piece of molten de-hydrated B_2O_3 during quenching.

50. The method of claim 49, further comprising cooling the molten alloy to a temperature halfway between its melting temperature and its glass transition temperature while still in contact with the piece of molten de-hydrated B_2O_3, then re-heating the alloy above its melting temperature while still in contact with the piece of molten de-hydrated B_2O_3 prior to quenching the alloy.

51. The method of claim 50, wherein the cooling and reheating are repeated at least two times.

52. The method of claim 50, wherein the cooling comprises cooling the molten alloy to below its glass transition temperature.

53. The method of claim 51, further comprising reheating the alloy above its melting temperature after quenching and then re-quenching the alloy from above its melting temperature to a temperature below its glass transition temperature at a sufficient rate to prevent the formation of more than a 50 % crystalline phase.

54. The method of claim 48, further comprising:

providing a quantity of feedstock materials for making the Pt-based alloy; and

melting the feedstock under vacuum to form the molten alloy such that no flotation of bubbles can be observed.

55. The method of claim 49, wherein the molten alloy is processed under vacuum.

56. The method of claim 50, wherein after reheating the molten alloy is put under vacuum until no bubble flotation can be observed.

57. The method of claim 51, wherein after the final reheating the molten alloy is put under vacuum until no bubble flotation can be observed.

58. The method of claim 52, wherein after reheating the molten alloy is put under vacuum until no bubble flotation can be observed.

59. The method of claim 53, wherein the post-quenching reheating is conducted under vacuum until no bubble flotation can be observed.

60. The method of claim 54, wherein after melting under vacuum the pressure is increased from 5 to 150 psi.

61. The method of claim 55, wherein after processing the alloy under vacuum the pressure is increased from 5 to 150 psi.

62. The method of claim 56, wherein after application of the vacuum the pressure is increased from 5 to 150 psi.

63. The method of claim 57, wherein after application of the vacuum the pressure is increased from 5 to 150 psi.

64. The method of claim 58, wherein after application of the vacuum the pressure is increased from 5 to 150 psi.

65. The method of claim 59, wherein after application of the vacuum the pressure is increased from 5 to 150 psi